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10/791,048

03/02/2004

Juan Landeros

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2860

8791

7590

04/26/2007

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EXAMINER .

SEMENENKO, YURIY

ART UNIT

PAPER NUMBER

2841

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

04/26/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/791,048

Applicant(s)

LANDEROS ET AL.

Examiner

Yuriy Semenenko

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 and 29-46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 29-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) -
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 02/12/2007 has been entered.

### ***Response to Amendment***

2. Amendment filed on 02/12/2007 has been entered.  
In response to the Office Action dated 08/09/ 2006, Applicants have amended claims 1, 31 and 41 and 44  
Claims 1-10 and 29-46 are now pending in the application.

### ***Claims***

3. Claim 44 amendments filed on 02/12/2007 are considered and is acknowledged. The claim amendments are approved.

### ***Response to Arguments***

4. Applicant's arguments filed 02/12/2007 have been considered but are moot in view of the new grounds of rejection.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5.1. Claims 1-4, 29, 31-34, 41 and 45 are rejected under 35U.S.C. 103(a) as being unpatentable over Juskey et al. (Patent # 6356453) hereinafter Juskey in view of Thompson et al. (Patent #5218234) hereinafter Thompson.

As to claim 1: Juskey discloses in Fig. 8 an article 600 comprising: a mounting substrate 512; a passive component site 518 on the mounting substrate; an active component site 519 on the mounting substrate,

except, Juskey does not disclose a fluid flow barrier disposed local to the passive component site and spaced apart from the active component site, the fluid flow barrier comprising an unfilled recess; and an underfill material filling a space between the active component site and the mounting substrate, the underfill material stopping at or near an edge of the recess.

Thompson teach in Fig. 2 a fluid flow barrier disposed spaced apart from the active component site 10, the fluid flow barrier comprising an unfilled recess 26; and an underfill material 18 filling a space between the active component site 10 and the mounting substrate 16, the underfill material stopping at or near an edge of the recess (column 4, lines 14-19).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention that a fluid flow barrier disposed local to the passive component site and spaced apart from the active component site, the fluid flow barrier comprising an unfilled recess; and an underfill material filling a space between the active component site and the mounting substrate, the underfill material stopping at or near an edge of the recess in order to underfill material just reach the interior edge of the opening, as taught by Thompson (column 4, lines 14-19).

As to claim 31: Juskey discloses in Fig. 8 an article 600 comprising: a mounting substrate 512; a first component site 518 on the mounting substrate; an second component site 519 on the mounting substrate,

except, Juskey does not discloses a fluid flow barrier disposed local to the first component site and spaced apart from the second component site, the fluid flow barrier comprising an unfilled recess; and an underfill material filling a space between the second component site and the mounting substrate, the underfill material stopping at or near an edge of the recess.

Thompson teach in Fig. 2 a fluid flow barrier disposed spaced apart from the active component site 10, the fluid flow barrier comprising an unfilled recess 26; and an underfill material 18 filling a space between the active component site 10 and the mounting substrate 16, the underfill material stopping at or near an edge of the recess (column 4, lines 14-19).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention that a fluid flow barrier disposed local to the passive component site and spaced apart from the active

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component site, the fluid flow barrier comprising an unfilled recess; and an underfill material filling a space between the active component site and the mounting substrate, the underfill material stopping at or near an edge of the recess in order to underfill material just reach the interior edge of the opening, as taught by Thompson (column 4, lines 14-19).

As to claim 2 and 32: Juskey discloses the article having all of the claimed features as discussed above with respect claim 1 (31), the mounting substrate 512, Fig. 8, including a first side 610U and a second side 610L, wherein the passive component site 518 and the active component site 519 are disposed in a solder mask 520 on the first side 610U, except, Juskey does not teach the fluid flow barrier is integral with the solder mask.

Thompson teaches in Fig. 2 the fluid flow barrier is integral with the solder mask 27 (column 3, lines 8-15).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the fluid flow barrier is integral with the solder mask in order to provide desired structure for underfill process, as taught by Thompson (column 3, lines 11-15).

As to claims 3 and 33: Juskey discloses the article having all of the claimed features as discussed above with respect claim 1(31),

except, Juskey does not teach the fluid flow barrier includes a sidewall and a floor, wherein the floor includes an electrically conductive material.

Thompson teaches in Fig. 2 the fluid flow barrier includes a sidewall and a floor 16, wherein the floor includes an electrically conductive material (column 3, line 20).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the fluid flow barrier includes a sidewall and a floor, wherein the floor includes an electrically conductive material to provide circuitry on surface of the substrate.

As to claim 4 and 34: Juskey discloses the article having all of the claimed features as discussed above with respect claim 1(31), the mounting substrate 512, Fig. 8 including a first side 610U and a second side 610L, wherein the passive component site 518 and the active component site 519 are disposed in a solder mask 520 on the first side 610U,

except, Juskey does not teach the fluid flow barrier is a trench in the solder mask, and wherein the trench describes a perimeter around the passive component site.

Thompson teaches in Fig. 2 the fluid flow barrier is a trench 26 in the solder mask, and wherein the trench describes a perimeter around the component site 10 (column 3, lines 58-68).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the fluid flow barrier is a trench in the solder mask, and wherein the trench describes a perimeter around the passive component site in order to prevent the spread of underfill material beyond of the trench as taught by Thompson (column 3, lines 66-68).

As to claim 41: Juskey discloses in Fig. 8 an article 600 comprising: a mounting substrate 512 including a first side 610U and a second side 610L, a first component site 518 on the mounting substrate; a second component site 519 on the mounting substrate; wherein the first component site 518 and the second component site 519 are disposed in a solder mask 520 on the first side 610U,

except, Juskey does not disclose a fluid flow barrier disposed local to the first component site and spaced apart from the second component site, wherein the fluid flow barrier is integral with the solder mask, the fluid flow barrier comprising an unfilled recess; and an underfill material filling a space between the second component site and the mounting substrate, the underfill material stopping at or near an edge of the recess.

Thompson teach in Fig. 2 a fluid flow barrier disposed spaced apart from the active component site 10, the fluid flow barrier is integral with the solder mask, the fluid flow barrier comprising an unfilled recess 26; and an underfill material 18 filling a

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space between the active component site 10 and the mounting substrate 16, the underfill material stopping at or near an edge of the recess (column 4, lines 14-19).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention that a fluid flow barrier disposed local to the passive component site and spaced apart from the active component site, the fluid flow barrier is integral with the solder mask, the fluid flow barrier comprising an unfilled recess; and an underfill material filling a space between the active component site and the mounting substrate, the underfill material stopping at or near an edge of the recess in order to prevent the spread of underfill material beyond of the opening, as taught by Thompson (column 3, lines 66-68 and column 4, lines 14-19).

As to claims 29 and 45: Juskey discloses the article having all of the claimed features as discussed above with respect claim 41. Further, the first component site 519, Fig. 7 is one of a plurality of first component sites (column 11, lines 15-20) and passive component site 518 is one of a plurality of passive component sites (column 11, lines 15-20).

5.2. Claims 5, 6, 30, 35, 36, 42-44 and 46 are rejected under 35U.S.C. 103(a) as being unpatentable over Juskey in view of Thompson as applied to claims 1, 31 and 41 above, and further in view of Tang et al. (Patent #6291264) hereinafter Tang.

As to claims 5 and 35: Juskey discloses the article having all of the claimed features as discussed above with respect claims 1(31),

except, Juskey does not teach the perimeter includes a trench side that is adjacent and spaced apart from the active component site, and wherein the trench side that is adjacent and spaced apart from the active component site includes a non-linear boundary.



Tang discloses in Fig. 3 the perimeter includes a trench side 20' that is adjacent and spaced apart from the active component site 100', and includes a non-linear boundary (at each corner of the trench).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the perimeter includes a trench side that is adjacent and spaced apart from the active component site, and wherein the trench side that is adjacent and spaced apart from the active component site includes a non-linear boundary, as taught by Tang because Tang teaches dispensed resin would be confined by the groove structure (column 4, lines 54-57).

As to claims 6, 36 and 42: Juskey discloses the article having all of the claimed features as discussed above with respect claims 1(31),

except, Juskey does not teach the non-linear boundary is selected from curvilinear, rectilinear, and combinations thereof.

Tang discloses as shown in Fig. 3 teach the non-linear boundary is rectilinear.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the non-linear boundary is rectilinear thereof to make room for another components.

As to claim 43: Juskey discloses the article having all of the claimed features as discussed above with respect claim 41 and 42, wherein the non-linear boundary is selected from curvilinear, rectilinear, and combinations thereof,

Although, Juskey does not explicitly teach the non-linear boundary is composite of rectilinear segments and curvilinear segments, at time the invention was made, it was old and well-know to use the non-linear boundary is composite of rectilinear segments and curvilinear segments. This shape is one of many known shape for the non-linear boundary. Sometimes this shape depends on technology process of making this trench (boundary). Tang discloses in Fig. 3 a non-linear boundary (at each corner of the trench) and this non-linear boundary is selected from curvilinear, rectilinear, and combinations thereof is just one of many shape. And further, it has been held In re

Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) that change in shape and change in size of the configuration of the claimed device was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the non-linear boundary is composite of rectilinear segments and curvilinear segments, as taught by Tang because Tang teaches dispensed resin would be confined by the groove structure (column 4, lines 54-57).

As to claims 44: Juskey discloses the article having all of the claimed features as discussed above with respect claim 41, wherein the fluid flow barrier is a trench in the solder mask, wherein the trench describes a perimeter around the first component site, wherein the perimeter includes a trench side that is adjacent and spaced apart from the second component site, wherein the trench side that is adjacent and spaced apart from the second component site includes an interior obtuse angle.

Although, Juskey does not explicitly disclose the perimeter includes a trench side that is adjacent and spaced apart from the second component site includes an interior an angle. This shape is one of many known shape for the non-linear boundary. Sometimes this shape depends on technology process of making this trench (boundary). Tang discloses in Fig. 3 a non-linear boundary (at each corner of the trench) and this non-linear boundary is selected from curvilinear, rectilinear, and combinations thereof is just one of many shape.

It has been held In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) that change in shape and change in size of the configuration of the claimed device was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the perimeter includes a

trench side that is adjacent and spaced apart from the second component site includes an interior angle in order to provide desired shape of trench for underfill process.

As to claims 30 and 46: Juskey discloses the article having all of the claimed features as discussed above with respect claim 1 (41), wherein the passive component site 518 is one of a plurality of passive component sites (column 11, lines 15-20), and the first component site 519, Fig. 7 is one of a plurality of first component sites (column 11, lines 15-20).

except, Juskey does not teach at least one fluid flow barrier presents a non-linear boundary toward the active component site and at least one fluid flow barrier presents a non-linear boundary toward the second component site.

Tang discloses in Fig. 3 fluid flow barrier 20' presents a non-linear boundary toward the component site 21' (a non-linear boundary at each corner of the trench, Fig. 3)

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention at least one fluid flow barrier presents a non-linear boundary toward the active component site and at least one fluid flow barrier presents a non-linear boundary toward the second component site, as taught by Tang because Tang teaches dispensed resin would be confined by the groove structure (column 4, lines 54-57)

5.3. Claims 9 and 39 are rejected under 35U.S.C. 103(a) as being unpatentable over Juskey in view of Thompson as applied to claims 1 and 31 above, and further in view of Tang and in view of Chason et al. (PGPub #2004/0118599).

As to claim 9 and 39: Juskey discloses the article having all of the claimed features as discussed above with respect claim 1(31), further including at least one fluid flow barrier that is disposed general to the active component site.

except, Juskey does not teach further including at least one fluid flow barrier that is disposed general to the active component site.

Tang discloses in Fig. 3 the fluid flow barrier is a trench 20' that is disposed general to the active component site.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention including at least one fluid flow barrier that is disposed general to the active component site, as taught by Tang because Tang teaches dispensed resin would be confined by the groove structure (column 4, lines 54-57)

Although, Tang teaches only one a fluid flow barrier that is disposed general to the active component site and does not teach another a fluid flow barrier it would have been obvious to one having ordinary skill in the art the time the invention was made same fluid flow barriers around another electrical components. Chason discloses design with openings of the underfill around different components 464, 460C and 460b, Fig. 4. And further, It has been held that a mere duplication of parts, absent new or unexpected results, is within the level of ordinary skill. In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). In re Larson, 144 USPTQ 347 (CCPA 1965); In re Lockart, 90 USPQ 214 (CCPA 1951). (Although the reference did not disclose a plurality of ribs, the court held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced.).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention further including at least one fluid flow barrier that is disposed general to the active component site, as taught by Tang because Tang teaches dispensed resin would be confined by the groove structure (column 4, lines 54-57).

5.4. Claims 7, 8, 37 and 38 are rejected under 35U.S.C. 103(a) as being unpatentable over Juskey in view of Thompson as applied to claims 1 and 31 above, and further in view of Kemmochi et al. (PGPub #2004/0032706) hereinafter Kemmochi.

As to claims 7 and 37: Juskey discloses the article having all of the claimed features as discussed above with respect claim 1(31),

except, Juskey does not teach herein the passive component site is spaced apart a distance from the active component site in a range from about 5 mm to about 1 mm.

Kemmochi discloses herein the passive component site is spaced apart a distance from the active component site in a range from about 3-5 mm (page 6, [0095]. In this case we consider low-noise amplifier as an active component, and filter with capacitor and resistors as a passive component.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention herein the passive component site is spaced apart a distance from the active component site in a range from about 5 mm to about 1 mm, as taught by Kemmochi because Kemmochi teaches It is possible to reduce the length of line connecting filter with amplifier to making smaller a parasitic impedance component (page 6, [0097]).

As to claims 8 and 38: Juskey discloses the article having all of the claimed features as discussed above with respect claim 1(31),

except, Juskey does not teach herein the passive component site is spaced apart a distance from the active component site by about 1.7mm.

Kemmochi discloses herein the passive component site is spaced apart a distance from the active component site by about 1.7mm (page 7, [0107]. In this case we consider low-noise amplifier as an active component, and filter with capacitor and resistors as a passive component.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention herein the passive component site is spaced apart a distance from the active component site by about 1.7mm, as taught by Kemmochi because Kemmochi teaches that it is possible to reduce the length of line connecting filter with amplifier to making smaller a parasitic impedance component (page 6, [0097]).

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5.5. Claims 10 and 40 are rejected under 35U.S.C. 103(a) as being unpatentable over Juskey in view of Thompson as applied to claims 1 and 31 above, and further in view of Maa et al. (PGPub #2003/0070835) hereinafter Maa.

As to claims 10 and 40: Juskey discloses the article having all of the claimed features as discussed above with respect claim 1 (31),

except, Juskey does not teach the at least one fluid flow barrier includes a trench with a dielectric floor.

Maa discloses in Fig. 6 the at least one fluid flow barrier includes a trench 402 with a dielectric floor (page 2, [0032]) (Layer 402 and substrate 20 are made from epoxy resin (page 2, [0024])).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Juskey to include in his invention the at least one fluid flow barrier includes a trench with a dielectric floor, as taught by Maa because Maateaches the ion migration of the wiring of the "unsheltered portion" will be reduced (page 2, [0032]).


6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yuriy Semenenko whose telephone number is (571) 272-6106. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean A. Reichard can be reached on (571)- 272-2800 ext. 31. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

YS

  
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